6081-P
Wireless pH/ORP Transmitter

Figure 1. 6081-P

Essential Instructions – Read this before proceeding

Rosemount Analytical designs, manufactures, and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use, and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using, and maintaining Rosemount Analytical products. Failure to follow the proper instructions may cause any one of the following situations to occur: Loss of life; personal injury; property damage; damage to this instrument; and warranty invalidation.

- Read all instructions prior to installing, operating, and servicing the product. If this Instruction Manual is not the correct manual, telephone 1-800-654-7768 and the requested manual will be provided. Save this Instruction Manual for future reference.

- If you do not understand any of the instructions, contact your Rosemount representative for clarification.

- Follow all warnings, cautions, and instructions marked on and supplied with the product.

- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.

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Essential Instructions (continued)

• Install your equipment as specified in the Installation Instructions of the appropriate Instruction Manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.

• To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.

• When replacement parts are required, ensure that qualified people use replacement parts specified by Rosemount. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look alike substitutions may result in fire, electrical hazards, or improper operation.

• Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

Note

The Rosemount 6081 and all other wireless devices should be installed only after the 1420 Wireless Gateway has been installed and is functioning properly. Wireless devices should also be powered up in order of proximity from the 1420 Wireless Gateway, beginning with the closest. This will result in a simpler and faster network installation.

Note

Shipping considerations for wireless products (Power Modules):
The unit was shipped to you without the power module installed. Please remove the power modules from the unit prior to shipping.

Primary lithium power modules are regulated in transportation by the U. S. Department of Transportation, and are also covered by IATA (International Air Transport Association), ICAO (International Civil Aviation Organization), and ARD (European Ground Transportation of Dangerous Goods). It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Please consult current regulations and requirements before shipping.

The power module with the wireless unit contains two "C" size primary lithium/thionyl chloride power sources.

Each power module contains approximately 5 grams in each pack. Under normal conditions, the power module materials are self-contained and are not reactive as long as the power modules and the pack integrity are maintained. Care should be taken to prevent thermal, electrical or mechanical damage. Contacts should be protected to prevent premature discharge.

Power module hazards remain when cells are discharged. Power modules should be stored in a clean and dry area. For maximum power module life, storage temperature should not exceed 30 °C.

⚠ WARNING

Use only with Rosemount Smart Power Module PN 701PBKKF

⚠ WARNING

Potential Electrostatic Hazard – The plastic antenna may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.

⚠ WARNING

Mechanical Spark Hazard – The 6081 enclosure is made of aluminum alloy and given a protective polyurethane paint finish. However, care should be taken to protect it from impact or abrasion if located in Zone 0.
This applies to any Intrinsically Safe installation, whether the Class, Division or Zone system is used.

Quick Start Guide - 6081 Wireless pH Transmitter

1. Install the Power Module inside the rear enclosure. Follow the installation instructions on p.9 "Power Module Installation".

2. Wire the pH or ORP sensor to the transmitter. Refer to the sensor instruction sheet for details.

3. Once the connections are secure and verified, install the Power Module to power to the transmitter.

4. When the transmitter is powered up for the first time, Quick Start screens appear. Using Quick Start is easy.

    a. A blinking field shows the position of the cursor.

    b. Use the ◀ or ▶ key to move the cursor left or right. Use the ▲ or ▼ key to move the cursor up or down or to increase or decrease the value of a digit. Use the ▲ or ▼ key to move the decimal point.

    c. Press ENTER to store a setting. Press EXIT to leave without storing changes. Pressing EXIT also returns the display to the previous screen.

5. Choose a local language.

6. Choose measurement: pH, ORP, or Redox.

7. Choose preamplifier location. Select Xmtr to use the integral preamplifier in the transmitter.

8. Choose Off or On for displayed diagnostics.

9. Select measurement update rate. Select ENTER to choose an update rate of 1 minute or enter a value from 1 second to 10 minutes.

10. Choose temperature units: °C or °F

11. Choose Yes to Setup the Wireless Network or No if the Network ID and the Join Key have already been entered.

12. Enter the 5-digit Wireless Network ID. This ID number must match the Network ID of the 1420 Wireless Gateway.

13. Enter the 8-digit Network Join Key number 1 of 4 to match the 1420 Wireless Gateway. See the Note below for clarification.

14. Enter Network Join Key numbers 2, 3, and 4 to match the 1420 Wireless Gateway.

15. The transmitter will exit Quick Start and display the live measurement screen.

16. To change the Network ID or Join Key, HART address, or measurement-related settings from the default values, and to set security codes, press MENU. Select Program and follow the prompts. Refer to the appropriate menu tree.

17. To return the transmitter to default settings, choose Reset Analyzer in the Program menu.

Note regarding Wireless Device Configuration

In order to communicate with the 1420 Wireless Gateway, and ultimately the Information System, the transmitter must be configured to communicate with the wireless network. This step is the wireless equivalent of connecting wires from a transmitter to the information system.

Using a Field Communicator or AMS, enter the Network ID and Join Key so that they match the Network ID and Join Key of the gateway and other devices in the network. The Network Join Key consists of four (4) blocks, each with an eight digit code. The code of each block must match its corresponding block in the 1420 in order for the 6081 to join the network.

If the Network ID and Join Key are not identical, the transmitter will not communicate with the network. The Network ID and Join Key may be obtained from the 1420 Wireless Gateway on the Setup>Network>Settings page on the web server.

The final device network configuration piece is the Update Rate. This by default is one (1) minute. This may be changed at commissioning, or at any time via AMS or the 1420 Wireless Gateway's web server. The Update Rate should be between 1 second and 10 minutes.

When device configuration is completed, remove the power module and replace the rear cover of the transmitter until the time of actual live installation in the process. Tighten the cover to the proper tension for safety approvals.

Note

For installation and operation at high elevations, slight convex bulging of the front keypad overlay is possible. If bulging occurs, it is recommended to unscrew the two Philips head screws that faster the front cover to the central housing to release any internal pressure. This will equalize the device's internal pressure to the ambient atmospheric pressure. Re-tighten the two Philips head screws to secure the front cover before device installation or operation. Make sure to perform the pressure equalization in a clean, dry area.

Figure 2. Menu Tree for 6081 pH Wireless Transmitter
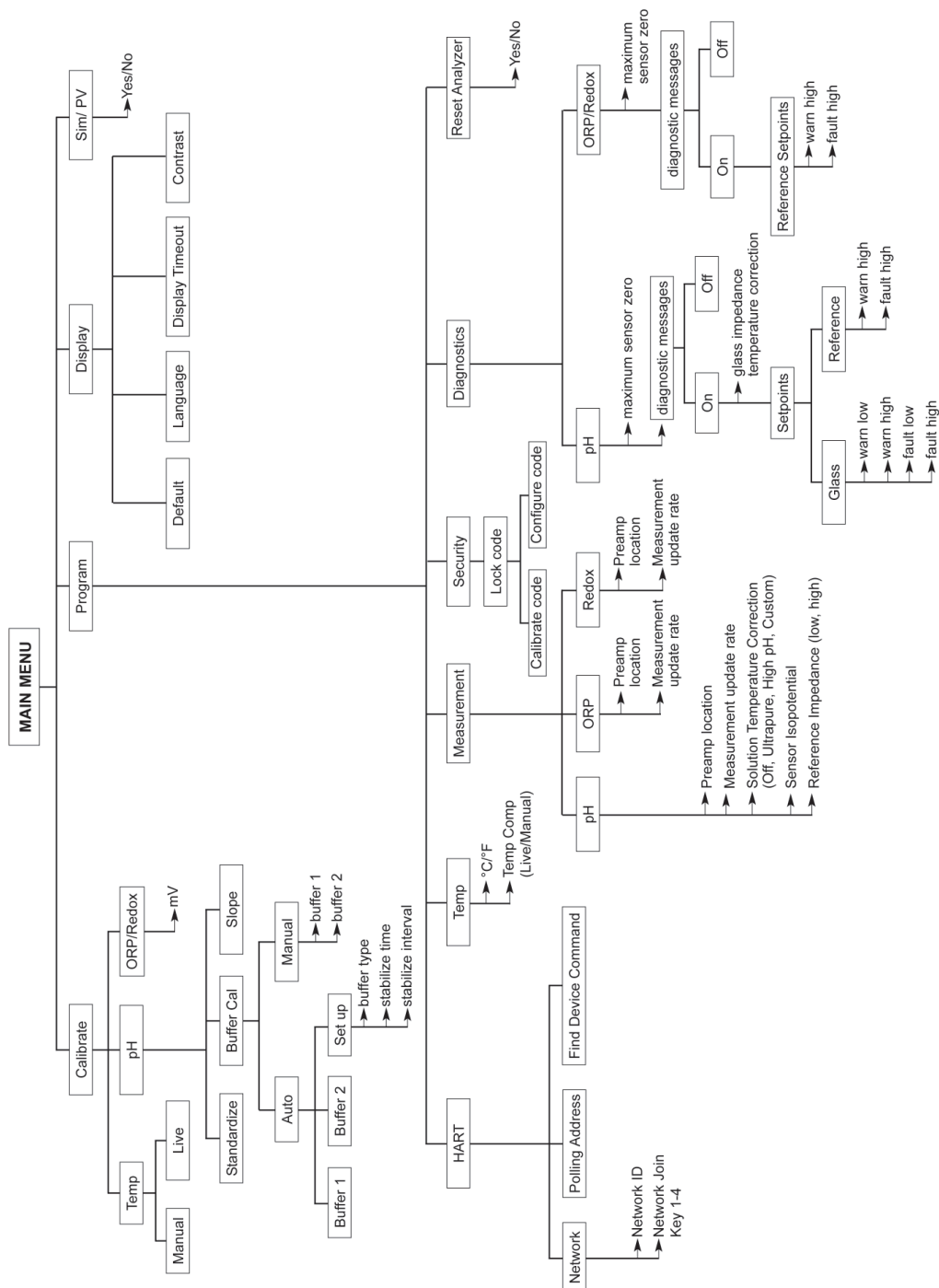
Product Description

When used with appropriate sensors, the 6081-P can measure pH or ORP (oxidation reduction potential) of a liquid and transmit data wirelessly with a radio transceiver which uses HART 7 communication protocol. The instrument has a local operator interface consisting of a keyboard and LCD display which can be used to observe process parameters or to configure the 6081. This instrument is available with approvals for use in hazardous areas.

General Specifications

Enclosure: Cast aluminum. NEMA 4X, IP66
Dimensions: 6.55" x 5.40" x 5.15" (166mm x 137mm x 131mm)
Conduit Openings: ¾" FNPT
Ambient Temperature: -4 to 149 °F (-20 to 65 °C)
Storage Temperature: -22 to 158 °F (-30 to 70 °C)
Relative Humidity: 0 to 95% (non-condensing)
Weight/Shipping Weight: 7 lbs/8 lbs (3.2/3.6 kg)
Digital Communications: HART 7 Wireless HART™

Functional Specifications

pH Range: 0 to 14
ORP Range: -1400 to +1400mV

Compatible with Rosemount Analytical SMART pH sensors

Calibrations/standardization: The automatic buffer recognition uses stored buffer values and their temperature curves for the most common buffer standards available worldwide. The transmitter also performs a stabilization check on the sensor in each buffer.

A manual two-point calibration is made by immersing the sensor in two different buffer solutions and entering the pH values. The microprocessor automatically calculates the slope which is used for self-diagnostics. An error message will be displayed if the pH sensor is faulty. This slope can be read on the display and/or manually adjusted if desired. An on-line one-point process standardization is accomplished by entering the pH or ORP value of a grab sample.

The following calibration methods are supported:
- Two point calibration with Low and High buffer (pH only)
- Two point calibration with Automatic Buffer recognition (pH only)
- Single point standardization
- Single point Temperature Adjustment
- Automatic calibration upon live connection to RAI SMART pH sensors and upload of stored cal data to transmitter

Automatic Temperature Compensation: External 3-wire Pt100 RTD or Pt1000 RTD located in the sensor, compensates the pH reading for temperature fluctuations. Compensation covers the range -10 to 150 °C (14 to 302 °F). Manual temperature compensation is also selectable.
Accuracy: ±1 mV @ 25 °C ±0.01 pH
Repeatability: ±1 mV @ 25 °C ±0.01 pH
Information and Status: Information screens display faults and warnings, radio transmission status, network ID number, Power Module voltage, transmitter model, and software version.
Diagnostics: The internal diagnostics can detect:

    RTD Failure
    Glass Low Failure
    Glass High Failure
    Broken Glass Fault
    Reference High Failure
    CPU Error
    High Temperature Warning
    Low Temperature Warning
    Glass Impedance High Warning
    Glass Impedance Low Warning
    Reference Impedance High Warning

EEPROM Warning
Sense Line Open Warning
Factory Cal Warning
Keyboard Warning

Once a fault or warning is detected, the display will show a message describing the problem.

Sensor Temperature Range: -10 to 150°C (PT100 and PT1000)

Display: 2-line, 16 character display supports display of pH and mV units. Display shows temperature.

Approvals:
RFI/EMI:
EN-61326
EN 301 489-1 V1.2 2002
EN 301 489-17: V1.4.1 2002
EN 60950-1: 2001
EN 300 328 V 1.6.1 (2004-11)

$C\epsilon$

Hazardous Location Approvals
Intrinsic Safety:

Special Conditions of Use:

1. The 6081 enclosure is made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in zone 0. This applies to any Intrinsically Safe installation, whether the Class, Division or Zone system is used.

2. Potential Electrostatic Hazard – The plastic antenna may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.

Complies with FM standards:
FM3600:1998
FM3610: 2010, ISA60079-0:2009, ISA60079-11:2009.
FM3611: 2004
FM3810: 2005
ANSI/IEC 60529:2004

Class I, Division 1, Groups A/B/C & D
Class II, Division 1, Groups E/F& G
Class III
T4 Tamb : -20 to +65 °C
Type 4x, IP66

Intrinsically Safe,
Class I, Division 1
Groups ABCD/T4
Ta = -20 °C to +65 °C – 1400322;
IP66
Class 1 Zone 0, AEx ia IIC T4
Ta = -20 °C to +65 °C – 1400322;
IP66

CE 1180 II1G
Baseefa 10 ATEX 0149X
Ex ia IIC T4 Ga (-20 °C ≤ Ta ≤ +65 °C
(source CE cert-6081 Baseefa)
Complies with Standards: EN
60079-0:2009, EN 60079-11:2007

Non-Incendive:

Nonincendive, Class I,
Division 2, Groups ABCD/T4
Ta = -20°C to +65 °C

Class I, Division 2,
Groups A, B, D
Dust Ignition Proof
Class II, Division 2,
Groups F & G
T4 Tamb : -20 to +65 °C

Environmental: The operating atmosphere of the transmitter must be consistent with the appropriate hazardous location certifications.

pH Calibration Procedure – Auto Buffer Calibration

1. Obtain two buffer solutions. Ideally, the buffer values should bracket the range of pH values to be measured.

2. Remove the pH sensor from the process liquid. If the process and buffer temperatures are appreciably different place the sensor in a container of tap water at the buffer temperature. Do not start the calibration until the sensor has reached the buffer temperature. Thirty minutes is usually adequate.

3. Press MENU. The main menu appears. Choose Calibrate.

4. Choose pH.

5. Choose BufferCal.

6. Choose Auto.

7. To continue with the calibration, choose Buffer1.Then go to step 8. To change stability criteria, choose Setup and go to step 19.

8. Rinse the sensor with water and place it in buffer 1. Be sure the glass bulb and the reference junction are completely submerged. Swirl the sensor.

9. The screen at left is displayed with "Wait" flashing until the reading is stable. The default stability setting is <0.02 pH change in 10 sec. To change the stability criteria, go to step 19. When the reading is stable, the screen in step 10 appears.

10. The top line shows the actual reading. The transmitter also identifies the buffer and displays the nominal buffer value (buffer pH at 25 °C). If the displayed value is not correct press ▼ or ▲ to display the correct value. The nominal value will change, for example from 7.01 to 6.86 pH. Press ENTER to store.

11. The screen at left appears momentarily.

12. The screen at left appears. Remove the sensor from Buffer 1, rinse it with water, and place it in Buffer 2. Be sure the glass bulb and the reference junction are completely submerged. Swirl the sensor. Choose Buffer2.

13. The screen is displayed with "Wait" flashing until the reading is stable. When the reading is stable, the screen in step 14 appears.

14. The top line shows the actual reading. The transmitter also identifies the buffer and displays the nominal buffer value (buffer pH at 25 °C). If the displayed value is not correct, press ▼ or ▲ to display the correct value. The nominal value will change, for example from 9.91 to 10.02 pH. Press ENTER to store.

15. The screen at the left appears momentarily.

16. If the calibration was successful, the transmitter will display the offset and slope (at 25°). The display will return to the screen in step 6.

17. If the slope is out of range (less than 45 mV/pH or greater than 60 mV/pH) or if the offset exceeds the value programmed in Section 8.4, an error screen appears. The display then returns to the screen in step 6.

18. To return to the main display, press MENU then EXIT.

19. Choosing Setup in step 7 causes the Buffer Stabilize screen to appear. The transmitter will not accept calibration data until the pH reading is stable. The default requirement is a pH change less than 0.02 units in 10 seconds. To change the stability criteria:

    a. Enter the desired stabilization time
    b. Enter the minimum amount the reading is permitted to change in the time specified in step 19a.

20. To return to the main display, press MENU then EXIT.

Sensor Wiring

Note
For additional wiring information on this product, including sensor combinations not shown here, please refer to either our online wiring programs or the Manual DVD enclosed with each product.
1056, 1057, 56, 5081, 6081, 54e, and XMT :
http://www3.emersonprocess.com/raihome/sp/liquid/wiring/XMT/ 1066 and sensors with SMART preamps:
http://www2.emersonprocess.com/en-US/brands/rosemountanalytical/Liquid/Sensors/Pages/ Wiring_Diagram.aspx
1055:
http://www3.emersonprocess.com/raihome/sp/liquid/wiring/1055/

General Information

pH and ORP sensors without preamps manufactured by Rosemount Analytical can be wired directly to the 6081-P wireless transmitter.

Sensor Wiring

To assist in sensor wiring, please refer to the one of the following resources:

1. Sensor Instruction Sheet – provided with each shipped sensor. Detailed wiring drawings show terminal block connections for each sensor lead.

2. Online wiring program available at http://www.emersonprocess.com/raihome/liquid/products/wiring/Xmt displays wiring schematics for all compatible pH sensors.

Note
All sensor wiring must be rated for ≥70 °C.

The following drawing identifies each terminal block lead position for pH sensors.

Figure 3. 6081 Sensor Wiring and Connection Points
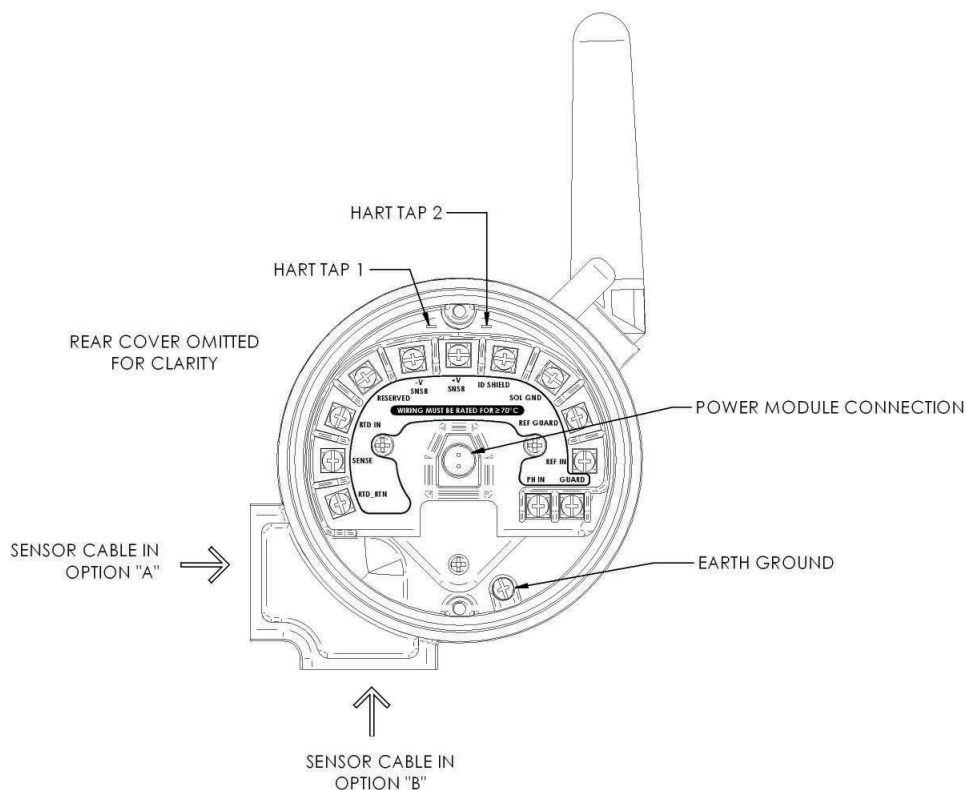
Power Module Installation / Replacement

The expected life of the power module (PN 701PBKKF) is a minimum of four years at reference conditions. This section describes the procedure for initial installation and replacement of the power module (PN 701PBKKF). The new power module should be stored in a safe place with a controlled environment until the 6081 is ready for live operation. Note that the power module is packed separately from the 6081 wireless transmitter upon delivery and must be installed initially.

For initial installation or replacement of the power module, follow these steps using a Philips-head screwdriver:

1. Unscrew the two long machine screws to remove the rear cover of the 6081. Separate the rear cover from the central housing by manually prying the sections apart. Do not use screwdrivers or tools to separate these housing parts. The parts are sealed with an o-ring.

2. Before installation, note the safety warning, disposal instructions and part information on the connection side label of the power module.

3. With the 6081 front display section facing away from you, align the power module pack with the curved surface of the pack facing towards you and the small protruding connector facing away from you. Make sure to align the power module and its keyed connector with the connection receptacle in the middle of the instrument's terminal block area.

4. With gentle pressure, insert the keyed connector on the power module into the receptacle (labeled Power Module Connection on the drawing). The power module seats in the connection receptacle with an o-ring.

5. Confirm that the power module is fully inserted in the receptacle and properly aligned with the surrounding terminal block.

6. Replace the rear cover of the 6081 with the two screws to secure it to the central housing. Tighten screws and verify operation. Correct installation the rear cover will ensure that the power module is properly secured to power the transmitter.

7. DO NOT RETURN SHIP THE USED POWER MODULE to Rosemount Analytical. Dispose of spent power modules as a hazardous material in accordance with government regulations.
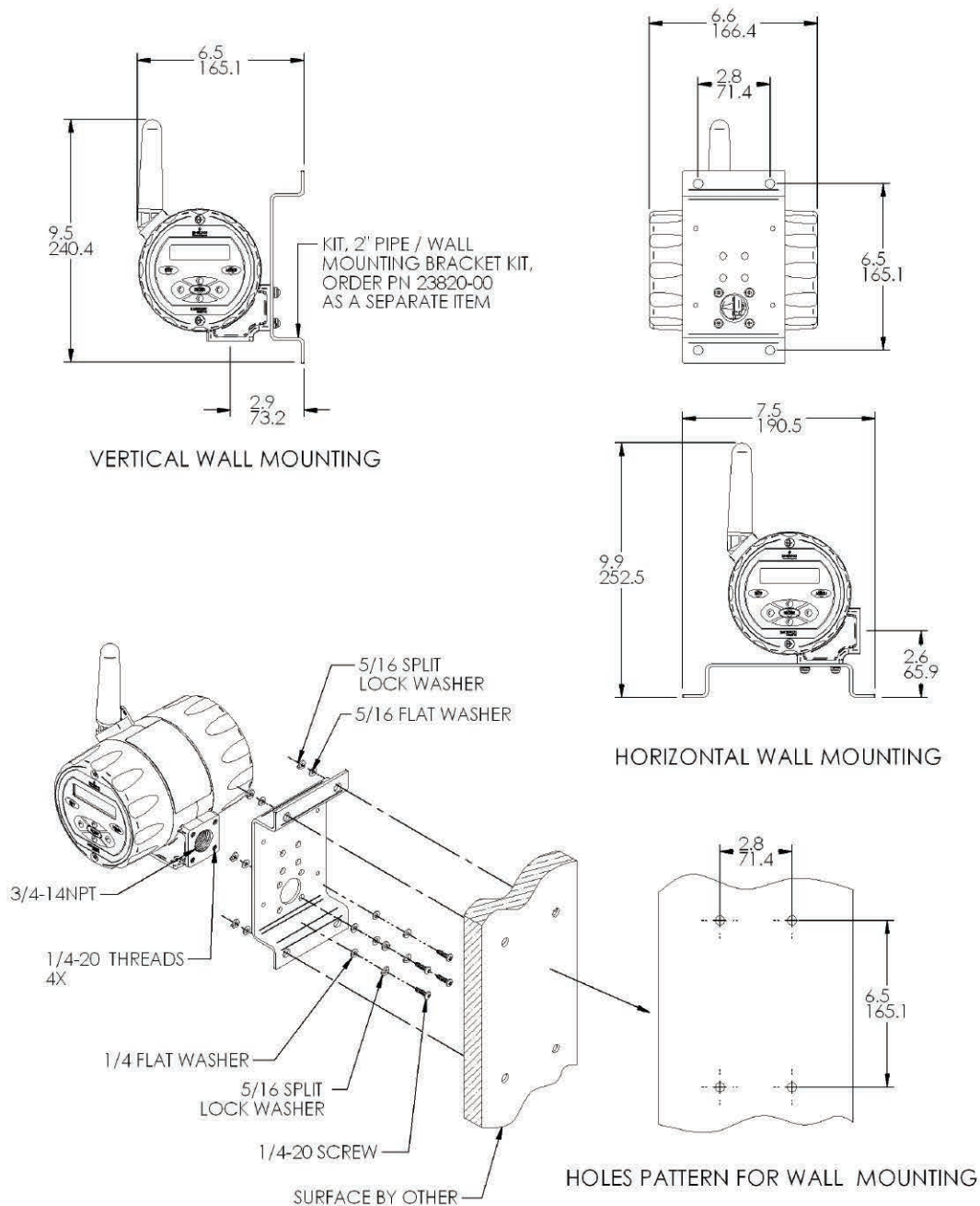
⚠ WARNING

Use only with Rosemount SMART Power Module (PN 701PBKKF)

Mounting

Mounting on a Flat Surface

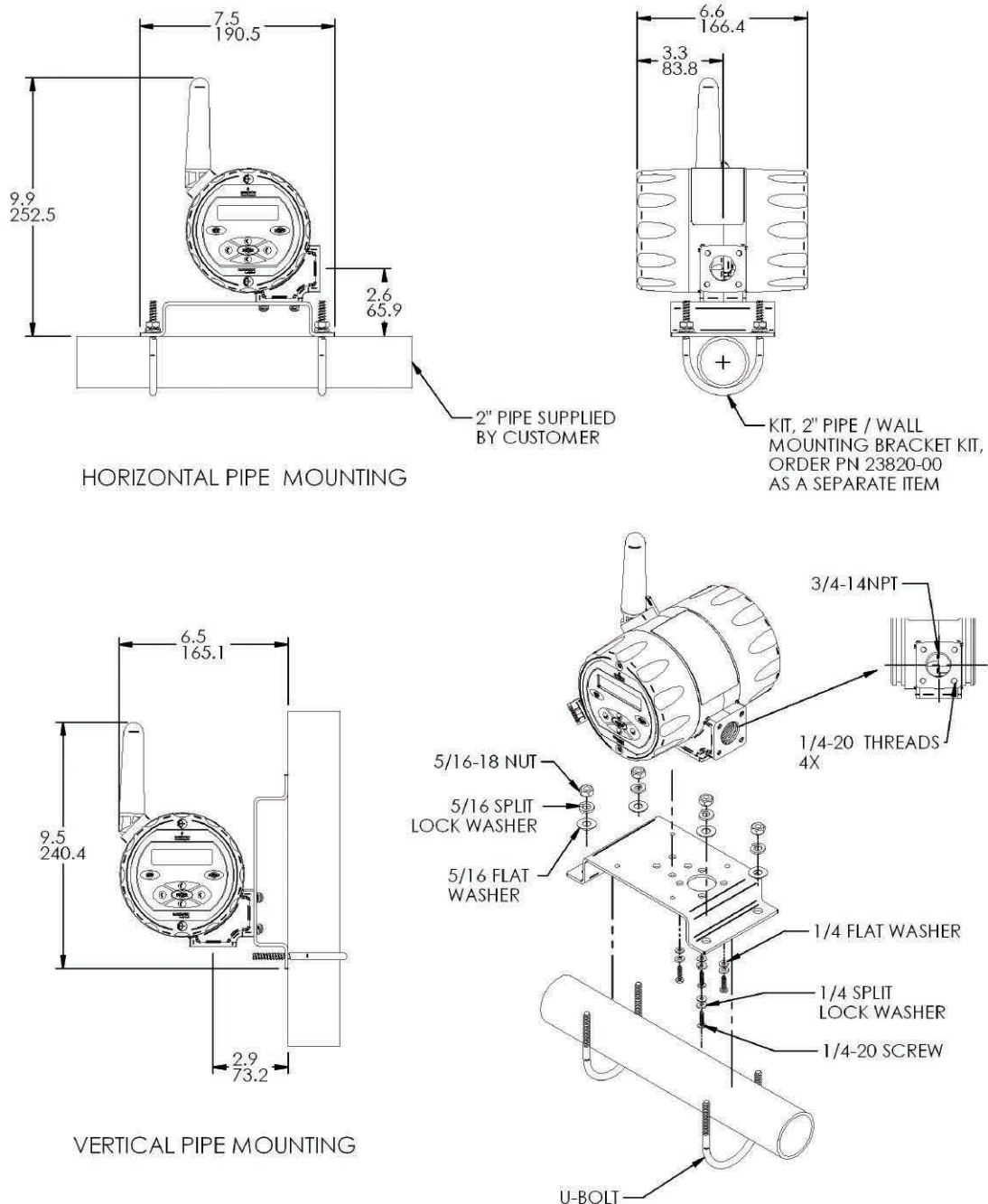**Figure 4. Wall Mounting Installation for 6081.**

Use Pipe/Wall Mounting Bracket Kit, PN23820-00
Note: PN 23820-00 mounting bracket kit includes mounting hardware for pipe mounting only. Wall mounting hardware to be provided by customer. Only use suitable fasteners and hardware to securely fasten the bracket and transmitter to the wall surface
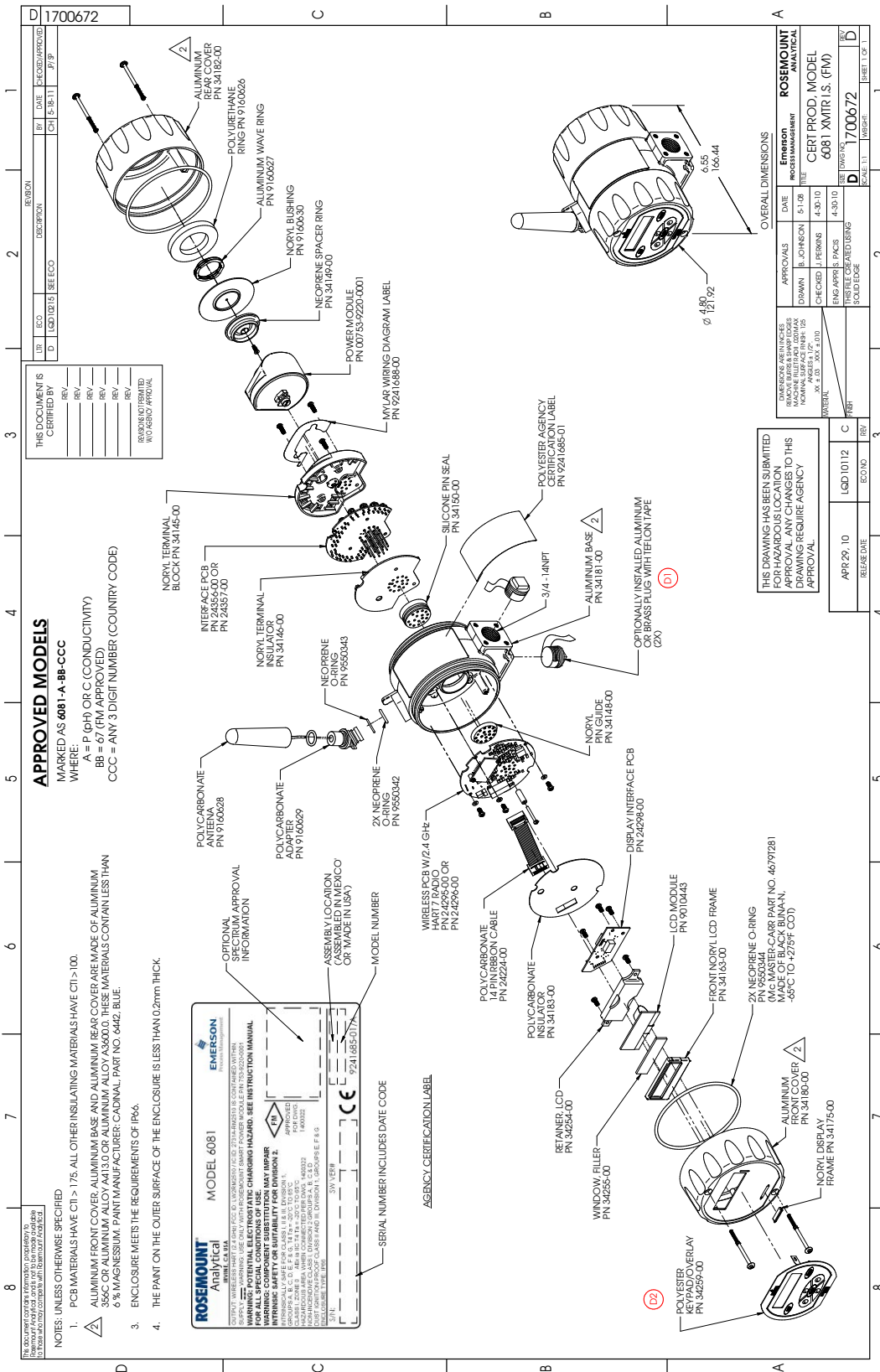
Pipe Mounting

The pipe mounting kit (PN 23820-00/01) accommodates 1–½ in. pipe

Figure 5. Pipe Mounting Installation for 6081.
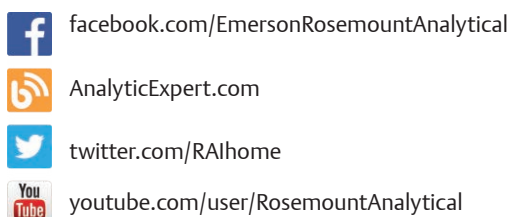

Use Pipe/Wall Mounting Bracket Kit, PN23820-00

Figure 6. FM IS Installation

Figure 7. CSA IS Installation

Figure 8. ATEX IS Installation

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Schedule
EC Declaration of Conformity

CE

R&TTE Directive (1999/5/EC)

6081 Wireless Transmitter

EN 301 489-1 V1.2 2002, EN 301 489-17: V1.4.1 2002
EN 60950-1: 2001
EN 300 328 V 1.6.1 (2004-11)

EMC Directive (2004/108/EC)

6081 Wireless Transmitter

EN 61326-1:2006

ATEX Directive (94/9/EC)

Provisions of the directive fulfilled by the equipment:
Equipment Group II, Category 1 G   Ex ia IIC T4 Ga   (-20°C ≤ Ta ≤ +65°C)

6081 Wireless Transmitter

Baseefa10ATEX0149X   ～   **Intrinsically Safe Certificate**

EN 60079-0:2009
EN 60079-11:2007

Special Conditions for safe use
1. The plastic antenna may present a potential electrostatic ignition hazard and must not be rubbed or cleaned with a dry cloth.
2. The 6081 enclosure is made of aluminum alloy and given a protective polyurethane paint finish; however, care should be taken to protect it from impact or abrasion if located in zone 0.

ATEX Notified Bodies for EC Type Examination Certificate

Baseefa [Notified Body Number: 1180]
Rockhead Business Park, Staden Lane
Buxton, Derbyshire SK17 9RZ
United Kingdom

ATEX Notified Body for Quality Assurance

Baseefa [Notified Body Number: 1180]
Rockhead Business Park, Staden Lane
Buxton, Derbyshire SK17 9RZ
United Kingdom

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EC Declaration of Conformity

CE
6081

We,   **Emerson Process Management**
Heath Place – Bognor Regis
West Sussex PO22 9SH
England

Declare under out sole responsibility that the product,

6081

manufactured by,

Emerson Process Management
Rosemount Analytical
2400 Barranca Parkway
Irvine, California 92606
USA

to which this declaration relates, is in conformity with the provisions of the European community Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Community notified body certification, as shown in the attached schedule.

(signature)

August 16, 2010
(date of issue)

Andy Kemish
(name printed)

Vice President Analytical, Europe
(function name printed)

EMERSON. Process Management

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